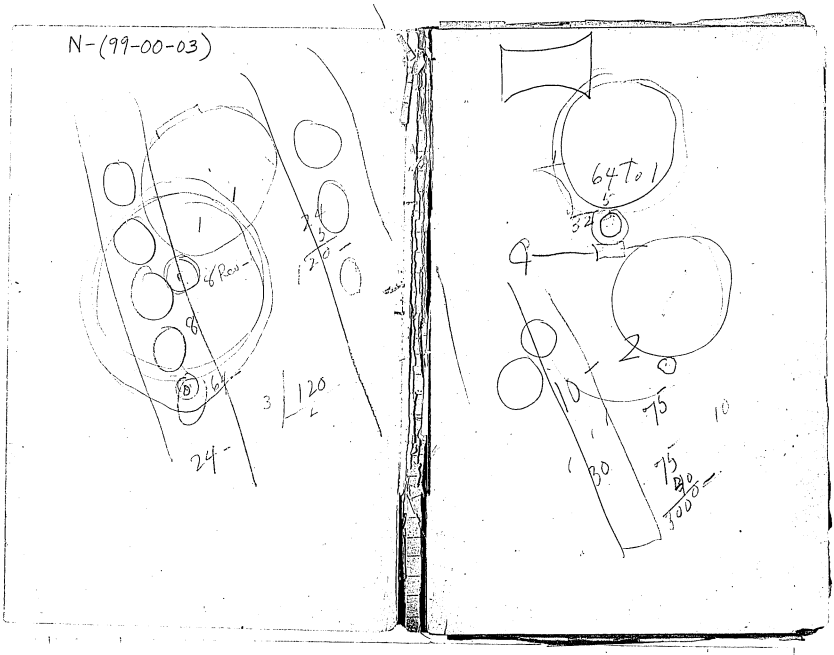
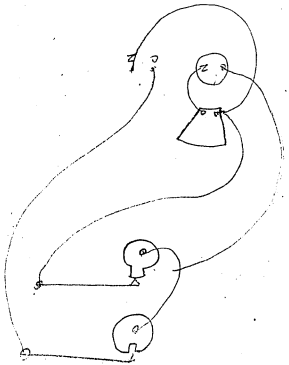
Notebook, N-99-00-00.4

This undated notebook was used by Edison, possibly during the period 1899-1904. The book contains instructions from Edison to an unidentified experimenter relating to work on the Edison-Lalande primary battery. Included are items pertaining to the composition of the material electroplated on the battery's zinc electrode. The pages are unnumbered. Approximately 90 pages have been used.

N-(99-00-03)

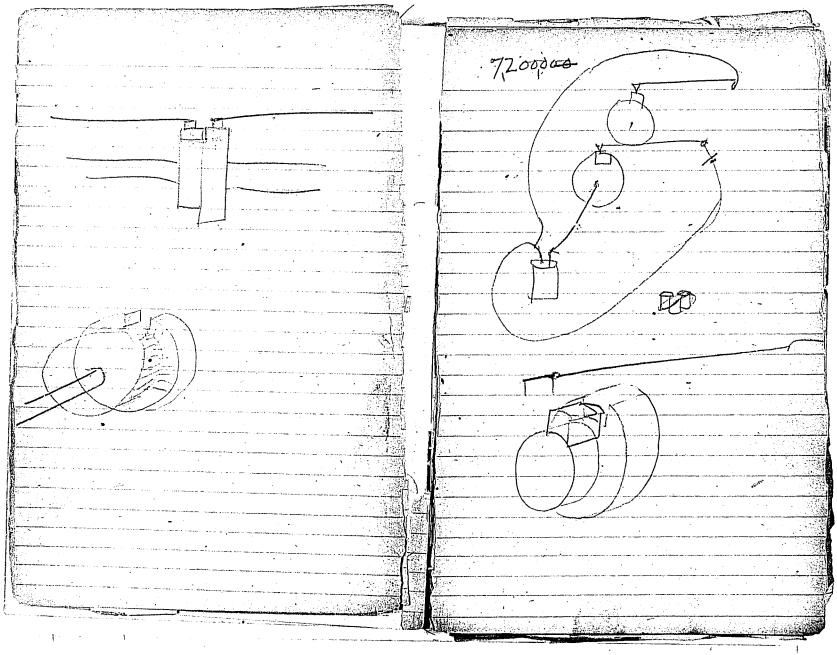




5 pm — ·3 amp
548 ·3 - off
Discharging at 5.48 =

Plating on a Rag Line
only little gas
Distilled 7 -
Intermittent one hour ·4
~~950 off~~ — 9

On 1020, New Solution
strong. 2 min =
845 on —


7200000

260000 –

3 –

26 –

800

27000 –

10 –

190 –

95000

146000 –

20000

261000

7½ m

1220 –

120

2440

1220

24621

20

420 +

800

1220

43000

1957500

110 –

24

120 – 10 –

12

80 –

20

160

7.5 –

261000

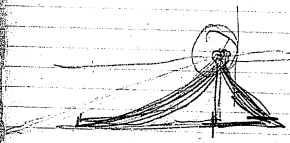
261500

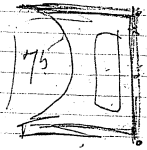
15

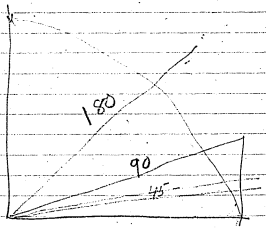
1305 00

1270

19575 00







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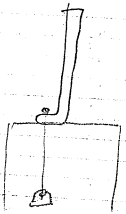

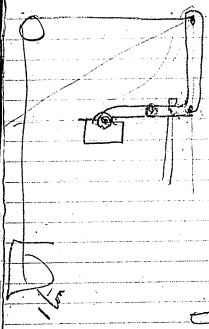

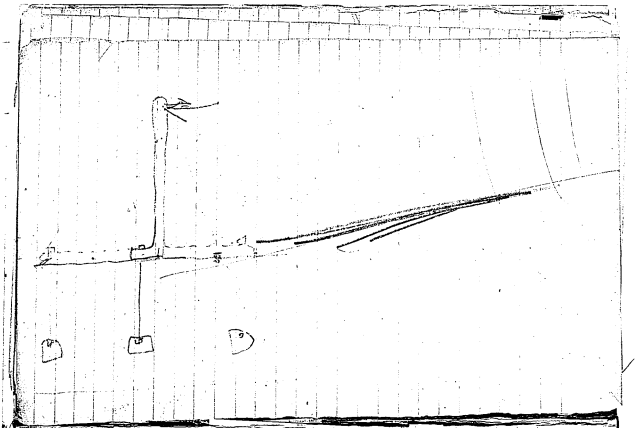

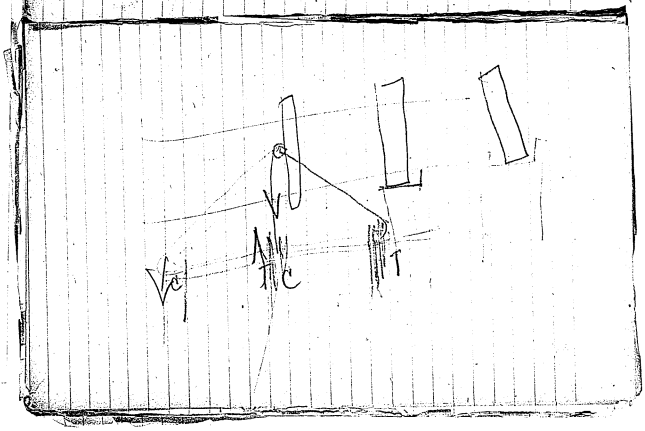
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Vc
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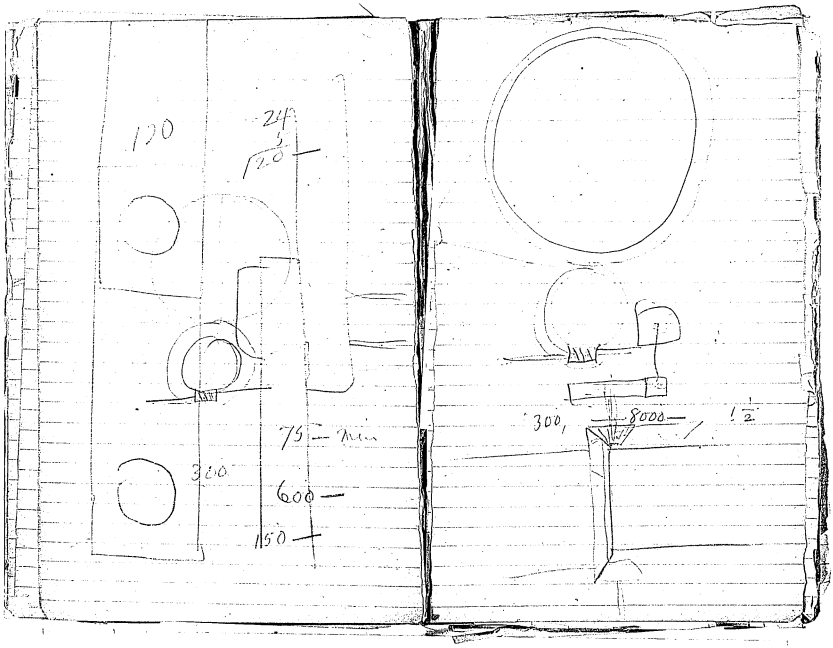
120
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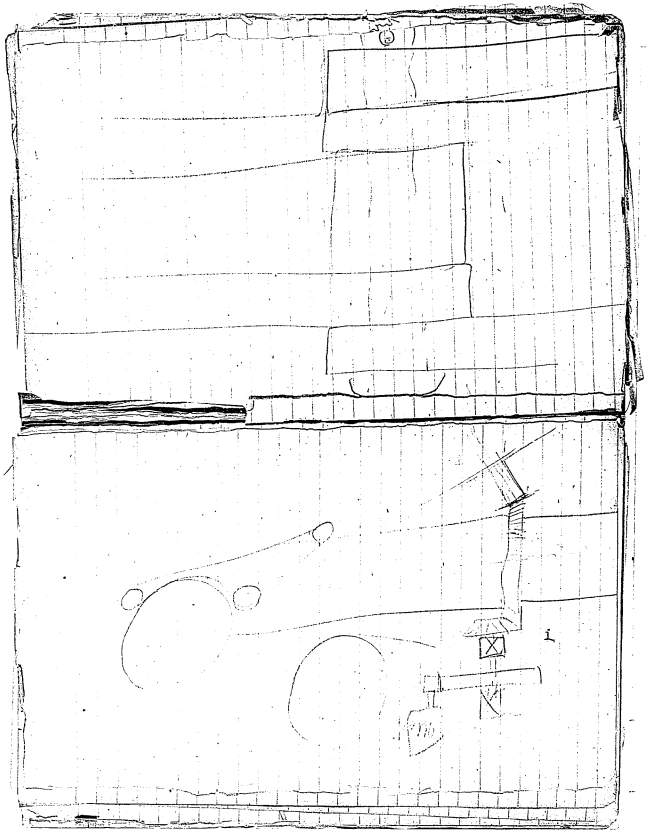
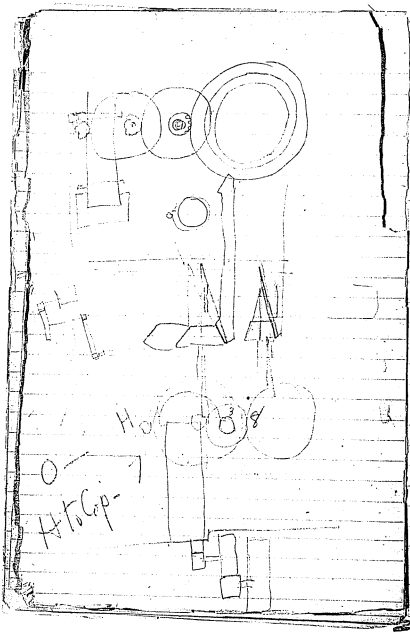
120
75 — Min
300
600 —
150 —
300
8000 —
1 1/2





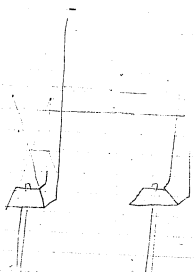
On	7.56	.55
	8.00	54
	812	60
	818	63
	826	64.4
	833	62
	839	50
	841	45

On 915 .36

Important

Rather weak Reg Sol by Zmc + Cu

Mi grid – Ni Kathod. HgO – ~~[illegible]~~ in Solution Na_2CO_3 Kat of I fine deposit except little fluffy on edges, scarcel any [illegible] on deposit. Zmd by Sul acid



1 Regular 200 c.c. 200 milg of Cyanide of Mercury

2 Reg — 500 milg HgCy

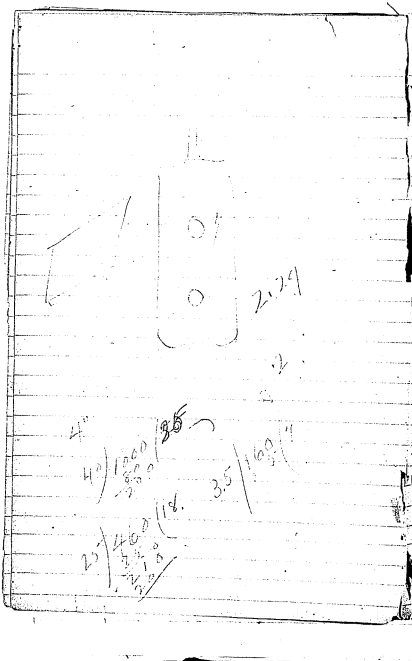
3 Reg 1 gram HgCy

4 Reg 3 " "

5 all you can get in of HgCy

In above use reduced flake Copper in Nickel grids to start with from plated Nickel Cathodes and change with one tenth of amperes Round the Edges of Nickel Cathode before plating —

OUEN



after plating with 1/10th amperes for 10 hours. Note in book the general appearance & quality of deposit if firm or not & if commercially good. If none are good discharge them all & start all over again at 1/2 amperes for 10 hours.

But if they are good - discharge them at rate of say 4 or 5/10ths of ampere in series - & check up & see efficiency. When fully discharged start in again recharging the same as before with out length of amperes. If results were good at that rate if any cell turned out bad & showed clearly that the amount of Mercury was insufficient to discount it ~~Keep changing~~. The next time of charge do not exceed the charge. Cells deteriorate 1/3rd of Zinc on & then Recharge & discharge 2 or 3 times always leaving 1/3 of Zinc

on — as this is the way it will be in practice —

at try all kinds of Experiments with the HgCy to find the best proportions to use to give the best total results of charging & discharging many times, note & book all defects & good points —

Having made all variations possible with the HgCy — go to next Experiment —

1st Reg —	5 drops	Nitrate Mercury
2nd "	10	"
3rd	20	"
4th	50	"
5th	150	"

Let the black oxide settle down after stirring solution then go ahead as before.

Cells just as you did with $HgCy_2$ –

3rd Experiment.

Make a solution of 2 oz. of Cyanide of Potassium in 250 cc of water, add as much $HgCy_2$ to it as it will take up. Then

1st Reg.	5 cc of benz	
2nd	10	"
3	25	"
4	50	"
5	100	"

This will of course cut down the amount of cc of Reg –

$Na_2O - 2ZnO$

Run these solutions just as the final.

Use pure scale made by Olt in all grides. After each experiment where a new mixed precipt has been used in the liquid or soda solution. Dont use the ordinary grids in a new experiment, but take the scale out of grids and put in new scale.

Run a test of 4 cells with Yellow Mercuric oxide.
To make yellow oxide use Chloride of Mercury or Mercuric Nitrate (Mercuric)
precipitate by Caustic soda C.P. dont use too much soda, Wash it well by decantation, & then filter, divide the solutions so that 200 Milligrams of Mercuric Nitrate is in one solution, use the precipitate from this after filtering in the 1st cell precipitate the Hg out of another part that holds 400 Milgrms & put the precipitate in 2nd cell. 3rd cell use 800 Milgrms & 4th cells 1.500 Milgrams.

Meacurate of Calcium, 1st Look up Watts Dic "Mercury" you will see about about Salt + a reference to Berthotelt, look up the Original paper & make some in Solution, boil the Solution down & then divide it in ~~4 parts~~ 23 parts use 1 part in 1st Cell 3 parts in Second cell 7 parts in 3rd Cell 12 parts in 4th Cell & run a test.

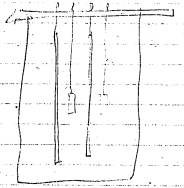
Rig up a large plating Cell with sheet Metal Electrodes Say 5 inches wide & 6 to 8 inches long you can corrugate them slightly to make them stiff

Put about 6 of them in a Cell between each suspend about the middle by a platinum wire a small piece of

1700 75

platinum say 1/2 by inch.

Make a fairly strong solution of Sulphated Zinc in distilled water. This solution grates fairly well. Then plate on the Nickel Electrode. The Zinc so that is about .005 thickness on a side. If it is plated quickly you can keep on plating thicker



Then hoist out and wash in plain water. Then immerse in dilute (ammonia) water. ~~[illegible]~~ test for H_2SO_4 by $CaCl_2$ Barium —

Then put into a jar of 20%

or perhaps what is better 15%
solution of Reg CP Soda —
plate the Zinc off into the solution
but dont plate it all. 65 say
60 to 75% because I am afraid
bare spots might be on the nickel &
nickel might go in — also look
out when you immerse in the
Soda Solution that there is
Zinc above the liquid & no bare
nickel is exposed to solution.

~~You can then if the Zincate of~~
~~Soda isnt strong enough in~~
~~Weak the Unplated well in ordy~~
~~water then in distilled water~~
~~& put them in the Sulphuric~~
~~of Zinc again & plate more on~~
~~by the light the~~

Then take the grids & dissolve
Zinc off by weak Sulphuric
or Hydrochloric Weak well
& replate another load
of Zinc on & take this

off over to the Sodi Solution in the same way until you have it saturated
Thus you will get a solution free from the impurities that goes in when we use zinc fright with the solution —

This solution you can hold in reserve until you get a combination that in the Reg solution works fairly well then you can repeat it with the pure solution the operation of it will do better —

Run another test when you have got a fair Mercury in solution test, by adding 1 & say
1 cc of Ammonia to 1st cell,
3 cc of ammonia to 2nd cell
7 cc to 3rd 12 cc to 4th —

When you have pure materials & are getting fair results, run a cyanide of potassium test alone without mercury. 1st cell 200 milgrms 2nd cell 700 milgrms 3rd 1200 milgrms 4th 2½ grams. If a large amount shows test from another trial starting at 3½ grms of gold & up.

Another test with Black oxide mercury and Oxalate of Ammonia
1st cell ½ gram 2nd cell 2 grms
3rd 5 grms 4th cell 12 grms
of Oxalate Soda or Potash
The amount of Oxide of Hg whether black or yellow will be determined by previous experiments. The Oxalate is only an attempt to improve the results.

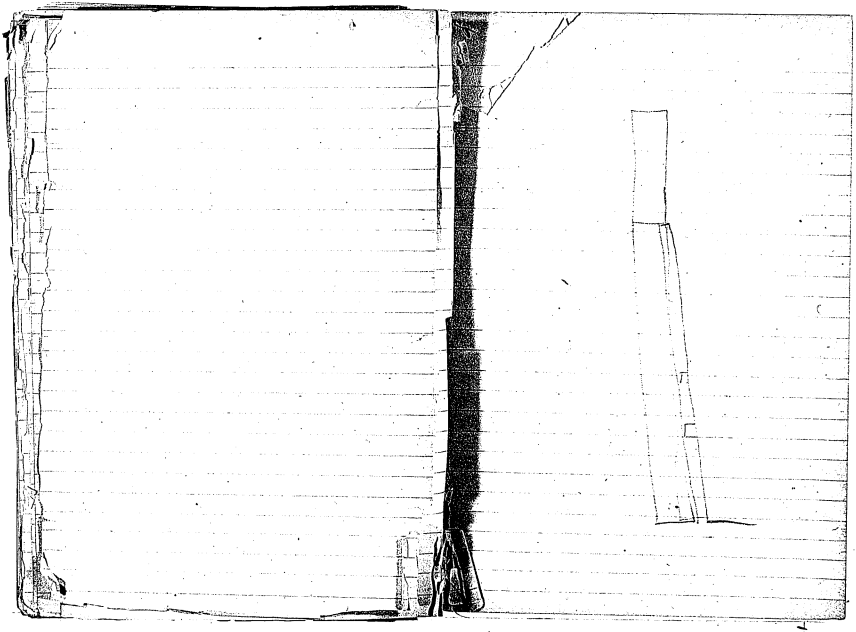
other things for improving
could be used but they will
have to be either Potash Soda
Ammonia, or Calcium Salts,
otherwise there will be an
action on the Soda
Before trying any salt test
a little in the regular Zincate
solution to see there is no
precipitate or action,

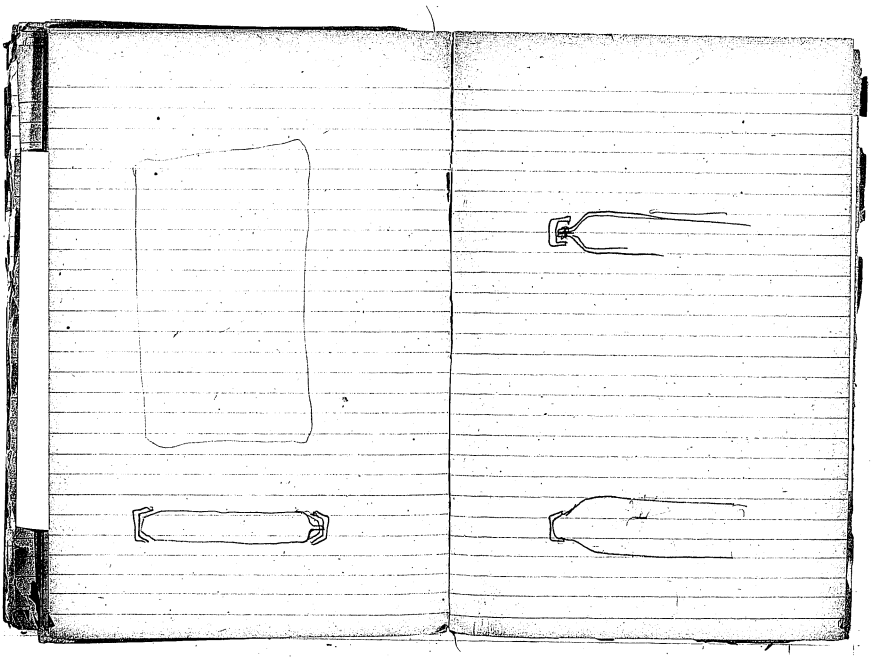
Only use in above CP salts
and We have not got them send
for them —
Tell Dennis that I told you
to report the time taken on
stripping chemicals, this will
insure your getting them quick

Have shock away Copper
scale for Copper & impurit

	Lime	Soda	Potash	Ammonia
Oxalate,		✓	✓	
Acetate	"	✓		" ✓
Citrate	"			"
Tartrate	"			" ✓
Trichloroacetate	"			"
Manganate	"			" ✓
Tungstate	"	✓		"
Phosphate	"			" ✓
Sulphate ✓	"			"
Nitrate ✓	"			"
Borate,				
Aluminate				
Chromate,				
Molybdate		✓		
Vanadate of ammonium —				
Succinate				
Benzoate				
Salicylate				
~~Tannate~~				
T. Sulphuret				
~~Thio~~				

When you Can't get any better Results, take your best results & transfer it to Potash instead of Soda





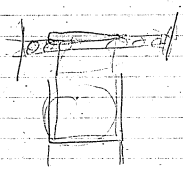
On at 4.30 — .42 amp

Closed 1/10 of time every 10 seconds

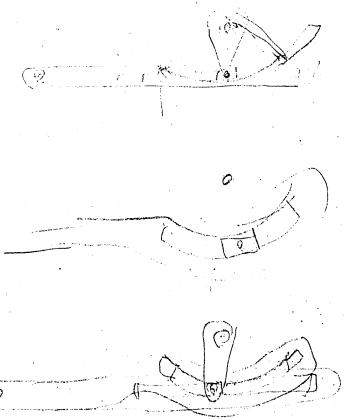
Electrode had Zn deposited before this
test and whole taken off out outside
in weak H_2SO_4 — electrode only
rinsed — $CP\ H_2O$ —
off in 30 minutes 5 pm — H_2SO_4
dont allcode so bad and deposit very
much better than 1st deposit
Entire off 8 minutes

3rd started 5.10 —
Very good much better than previous one

4th 5.52
off 5.27 | 35 min



25 | 3.10 (1.24
25
60
50
100



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12 | 772 (64.3
72 | 1 5
5 | 32 15
48 | 643
4 | 9645